



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/982,481	10/17/2001	Ming C. Hao	10014772-1	7017
<div>7590 05/08/2007 HEWLETT-PACKARD COMPANY Intellectual Property Administration P.O. Box 272400 Fort Collins, CO 80527-2400</div>			<div>EXAMINER WANG, JIN CHENG</div> <div>ART UNIT 2628</div> <div>PAPER NUMBER</div>	
			<div>MAIL DATE 05/08/2007</div> <div>DELIVERY MODE PAPER</div>	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

09/982,481

**Applicant(s)**

HAO ET AL.

**Examiner**

Jin-Cheng Wang

**Art Unit**

2628

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 44-48, 50, 53, 54, 56, 59, 60 and 63-82 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 44-48, 50, 53-54, 56, 59-60, and 63-82 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/20/2007 has been entered. Claims 1-43, 49, 51-52, 55, 57-58, and 61-62 have been canceled. Claims 63-82 have been newly added. Claims 44, 47-48, 50, 53-54, 56, 59-60 have been amended. Claims 44-48, 50, 53-54, 56, 59-60, and 63-82 are pending in the application.

### ***Response to Arguments***

Applicant's arguments and declaration filed on March 20, 2007 has been considered, but are not found persuasive in view of the ground(s) of rejection set forth in the present Office Action.

Applicant's declaration filed March 20, 2007 is not sufficient to overcome the cited references for the reasons given below.

In the declaration filed on March 20, 2007, applicants addressed the Keim reference, i.e., D. Keim, M. C. Hao, J. Ladisch, M. Hsu, U. Dayal, "Pixel Bar Charts: A New Technique for Visualizing Large Multi-Attribute Data Sets without Aggregation", HP Technical Report, April 11, 2001, pp. 1-10 (hereinafter Keim). Applicant stated that, "the entire content of the Keim HP Technical Report originated with or was obtained from the Applicant of the present application"

Art Unit: 2628

and “the authors of the Keim HP Technical Report derived their knowledge of the subject matter described in the Keim HP Technical Report from the Applicant of the present application.”

These statements are inappropriate and inaccurate for the reasons set forth below while they are merely statements and are not supported by evidence. They are deemed insufficient to overcome the cited reference. Moreover, applicant failed to provide support to the statements and speculated, “the entire content of the Keim HP Technical Report originated with or was obtained from the Applicant of the present application”.

Applicant further speculated that, “the authors of the Keim HP Technical Report derived their knowledge of the subject matter described in the Keim HP Technical Report from the Applicant of the present application.” However, applicant failed to provide a date of the reduction to practice of the present application that may be prior to the publication date of Keim HP Technical Report as the Keim HP Technical Report is published several months before the filing date of the present application. The prior publication date of the Keim reference suggests the contrary to the applicant’s statement, i.e., the content or the claim invention of the present application was originated with and was obtained from the Keim HP Technical Report. Moreover, the Keim HP Technical Report is NOT fully described in the present application as the descriptions set forth in Keim HP Technical Report and those in the present application are substantially different. For example, the disclosure set forth in Keim HP Technical Report is not the same as the disclosure in the present application. The Keim HP Technical Report is substantially different from the present application at least for the reasons that the contents of the Keim HP Technical Report differ from the description of the present application. Applicant thus failed to support how the difference in the Keim HP Technical Report can be derived from the

Art Unit: 2628

Applicant of the present application. The inventor Adrian Krug has not contributed to the Keim HP Technical Report. Finally, applicants have not properly addressed the fact that Adrian Krug who is not the author of the published Keim HP Technical Report by submitting 1.312 Declaration stating that Adrian Krug should have been an author of the Keim Technical Report. However, the general public already knows that Adrian Krug is not an author of the printed publication. It is too later for applicant to add an author in the already published printed publication.

At least one of the applicants (Keim) is NOT one of the authors in the reference publication cited in above. The reference publication is NOT the applicant Keim's work. Applicant Keim has not contributed to the printed publication cited in above. The Declaration under MPEP 1.132, filed on March 20, 2007 by the applicants, is not proper at least for this reason.

Applicant argues that Figures 4, 5 and 7 of Ankerst also illustrate visualizing all of the attributes of all of the records thus depicting using assigning multiple pixels to the same record. In response, Ankerst meets the claim limitations set forth in the claim 1 and similar claims for the reasons below. Applicant's claim 1 recites a pixel bar chart which is a graphically displayable array according to the Paragraph 1, Page 4 of applicant's specification. Applicant's specification at Paragraph 1, Page 4 also stated that a method for placement data for visualization of multidimensional data sets using **multiple pixel bar charts**. Thus, a pixel bar chart is a graphically displayable array, or a pixel bar chart within the multiple pixel bar charts. Ankerst at

least discloses ONE pixel bar chart wherein a pixel is uniquely assigned a record. Ankerst at least discloses a pixel bar chart wherein a pixel uniquely represents a record (*e.g., the last row of the pixel bar charts of Fig. 3 represents a pixel bar chart which is particularly sorted by the attribute 120*). Therefore, Ankerst teaches the claim limitations set forth in the claim 1 and similar claims.

Ankerst discloses a method to form a pixel bar chart (*e.g., the last row of the pixel bar charts of Fig. 3 represents a pixel bar chart which is particularly sorted by the attribute 120*), comprising:

Obtaining a set of records, each record comprising a plurality of attributes (*e.g., Pages 3 of Ankerst discloses data records of the DNA training data with a plurality of attributes and Fig 5 plots 50,000 data records from two different classes with two numerical attributes*);

Assigning a pixel to each of said records to provide record-assigned pixels, wherein every such record-assigned pixel in the chart is assigned to a different record (*e.g., Figs. 3-5 and 7 discloses the pixel bar charts. e.g., the last row of the pixel bar charts of Fig. 3 represents a pixel bar chart which particularly sorted by the attribute 120 wherein every pixel in each of the charts is assigned to a unique record and the claim limitation that every pixel in the chart is assigned to a record is explicitly taught in column 2 of Page 3*); and

Constructing the pixel bar chart by (*Figs. 3-5 and 7 disclose pixel bar charts*);

Partitioning the record-assigned pixels into groups (*of pixels ordered according to the attribute values; see Figs. 4-5 wherein pixels are organized into groups along the y-axis in accordance with the categorical attribute numbers*) along a first axis of the pixel bar chart

Art Unit: 2628

according to a first dividing attribute (e.g., See Figs. 3-5 and 7 wherein the colored pixels are clearly shown wherein the first dividing attribute is set forth in the x-axis. See Page 3. Within a bar, the sorted attribute values are mapped to pixels in a line-by-line fashion according to their order (See Fig. 2 or Fig. 4 for this order). Each attribute is visualized independently from the other attributes in a separate bar. Thus the first dividing attribute is the ordering for the categorical attributes in accordance with the categorical attribute numbers; see Fig. 5);

Partitioning the record-assigned pixels in the groups into sub-groups (See Fig. 4-5 wherein the pixels in the groups of categorical attributes are further divided into sub-groups or class partitions along the x-axis in accordance with the splitting attribute by performing an n-ary split) along a second axis of the pixel bar chart according to a second dividing attribute (e.g., by splitting as disclosed in Page 5; the second dividing attribute is the splitting attribute and thus second dividing attribute is along the x-axis of Fig. 3-5 wherein the attributes are divided along the x-axis into class partitions by the virtue of the splitting attribute);

After partitioning into the sub-groups, sorting, in each of the sub-groups, the record-assigned pixels according to a first ordering attribute (e.g., See Figs. 3-5 and 7 wherein the pixels in the class partitions are sorted in accordance with the categorical attribute numbers and the first group of the class partitions is ordered in the lower level and the second group of the class partitions is ordered in the upper level; more categorical attributes are shown in Fig. 3) along the first axis of the pixel bar chart, and according to a second ordering attribute along the second axis of the pixel bar chart (Fig. 3-5 and 7 discloses the second ordering attribute on the x-axis, e.g., the second ordering attribute ordered according to the attribute values falling into Class A, Class B or Class C by splitting the pixels into the set of class partitions in accordance with the

Art Unit: 2628

splitting attribute wherein the second ordering attribute is the class partition attribute or the splitting attribute characterized by the categorical attribute numbers falling into the class partitions), wherein each record-assigned pixel is adjacent at least one other record-assigned pixel (Figs. 3-5 and 7).

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 44-48, 50, 53-54, 56, 59-60, and 63-82 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

#### **Claims 50, 53-54, and 70-75:**

Claim 50 recites a computer-readable medium having computer-readable program code embodied therein. The claimed computer readable medium is not necessarily a computer readable storage medium. The claimed program code is not necessarily computer executable instructions. There is no structural and functional interrelationship between the instructions and the rest of the computer to permit the instructions' functionality to be realized. Claim 44 is, thus, non-statutory.

Additionally, since claim 44 includes a 101 judicial exception, claim 44 must be for a practical application of the judicial exception. As is, claim 44 failed to recite either a physical



Art Unit: 2628

transformation or produces a useful and tangible result. Thus, claim 44 is also non-statutory for this reason.

Claims 53-54 and 7075 are non-statutory for the same reasons discussed above.

**Claims 44-48, 63-69, and 81-82:**

Claim 44 applies a computer program as part of a seemingly patentable process, however, claim 44 in reality seeks patent protection for the computer program as evidenced by claim 50 in the abstract. Computer program per se is neither computer components nor statutory process. Thus, claim 44 is non-statutory.

Additionally, since claim 44 includes a 101 judicial exception, claim 44 must be for a practical application of the judicial exception. As is, claim 44 failed to recite either a physical transformation or produces a useful and tangible result. Thus, claim 44 is also non-statutory for this reason.

Claims 45-48, 63-69 and 81-82 are non-statutory for the same reasons discussed above.

**Claims 56, 59-60, and 76-80:**

Since claim 56 includes a 101 judicial exception, claim 56 must be for a practical application of the judicial exception. As is, claim 56 failed to recite either a physical

Art Unit: 2628

transformation or produces a useful and tangible result. Thus, claim 56 is also non-statutory for this reason.

Claims 59-60 and 76-80 are non-statutory for the same reasons discussed above.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 44-48, 50, 53-54, 56, 59-60, and 63-82 are rejected under 35 U.S.C. 102(a) as being anticipated by D. Keim, M. C. Hao, J. Ladisch, M. Hsu, U. Dayal, “Pixel Bar Charts: A New Technique for Visualizing Large Multi-Attribute Data Sets without Aggregation”, HP Technical Report, April 11, 2001, pp. 1-10 (hereinafter Keim).

Re Claims 44, 50, 56 and 81:

Keim discloses a method to form a pixel bar chart, comprising:

Obtaining a set of records, each record comprising a plurality of attributes (*e.g.*, Pages 2-3 of Keim disclose a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as product type, number of visits and dollar amounts; the product type is used later as the partitioning attribute and the number of

Art Unit: 2628

*visits and dollar amounts as the x and y ordering attributes. The color represents the dollar amount spent by the corresponding customer wherein high dollar amounts correspond to bright colors and low dollar amounts to dark colors);*

Assigning a pixel to each of said records to provide record-assigned pixels, wherein every such record-assigned pixel in the chart is assigned to a different record (*e.g., Page 2 of Keim discloses the one-to-one correspondence between the data records and pixels in the pixel bar charts; see Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10*); and

Constructing the pixel bar chart by (*Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10 disclose pixel bar charts*):

Partitioning the record-assigned pixels into groups along a first axis of the pixel bar chart according to a first dividing attribute (*Fig. 7 discloses the first ordering attribute on the x-axis and the second order attribute on the y-axis as does Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10 wherein the first ordering attribute is the first dividing attribute; Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10. See also Page 2-3 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer; e.g., Pages 2-3 of Keim disclose a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as product type, number of visits and dollar amounts; the product type is used later as the partitioning attribute and the number of visits and dollar amounts as the x and y ordering attributes. The color represents the dollar amount spent by the corresponding customer wherein high dollar amounts correspond to bright colors and low dollar amounts to dark colors; see also Pages 6-7 for the partitioning algorithm or the pixel placement*

*algorithm; see Figs. 8-10 for the sub-groups of pixels according to a second dividing attribute);*

Partitioning the record-assigned pixels in the groups into sub-groups along a second axis of the pixel bar chart according to a second dividing attribute (Fig. 7 discloses the first ordering attribute on the x-axis and the second ordering attribute on the y-axis as does Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10 wherein the second ordering attribute is the second dividing attribute; Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10. See also Page 2-3 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer; e.g., Pages 2-3 of Keim disclose a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as product type, number of visits and dollar amounts; the product type is used later as the partitioning attribute and the number of visits and dollar amounts as the x and y ordering attributes. The color represents the dollar amount spent by the corresponding customer wherein high dollar amounts correspond to bright colors and low dollar amounts to dark colors; see also Pages 6-7 for the partitioning algorithm or the pixel placement algorithm; see Figs. 8-10 for the sub-groups of pixels according to a second dividing attribute);

After partitioning into the sub-groups, sorting, in each of the sub-groups, the record-assigned pixels according to a first ordering attribute along the first axis of the pixel bar chart, and according to a second ordering attribute along the second axis of the pixel bar chart (Fig. 7 discloses the first ordering attribute on the x-axis and the second order attribute on the y-axis as does Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10), wherein each record-assigned pixel is adjacent at least one other record-assigned pixel (Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10).

The claims 50, 56 and 62 are subject to the same rationale of rejection set forth in the claim 44.

Re Claims 45 and 57:

The claim 45 encompasses the same scope of invention as that of the claim 44 except additional claim limitation for each record-assigned pixel assigning a selectable visual indicator to the record-assigned pixel based on an attribute value of each record so that some pixels have a different visual indicator than other pixels. However, Keim further discloses the claim limitation for each record-assigned pixel assigning a selectable visual indicator to the record-assigned pixel based on an attribute value of each record so that some pixels have a different visual indicator than other pixels (*Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10. See also Page 2-3 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer*).

The claim 57 is subject to the same rationale of rejection set forth in the claim 45.

Re Claims 46 and 58:

The claim 46 encompasses the same scope of invention as that of the claim 45 except additional claim limitation the visual indicator comprises color. However, Keim further discloses the claim limitation the visual indicator comprises color (*Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10. See also Page 2-3 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer, e.g., sales amount, number of visits or sales quantity*).

The claim 58 is subject to the same rationale of rejection set forth in the claim 46.

Re Claims 47, 53 and 59:

The claim 47 encompasses the same scope of invention as that of the claim 44 except additional claim limitation said records are obtained from a multidimensional data set in which each record comprises a plurality of attributes and said method further comprises assigning a selectable visual indicator to each record-assigned pixel based on an attribute of each record so that some pixels have a different visual indicator than other pixels. However, Keim further discloses the claim limitation said records are obtained from a multidimensional data set in which each record comprises a plurality of attributes and said method further comprises assigning a selectable visual indicator to each record-assigned pixel based on an attribute of each record so that some pixels have a different visual indicator than other pixels (Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10. See also Page 2-3 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer; e.g., Pages 2-3 of Keim disclose a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as product type, number of visits and dollar amounts; the product type is used later as the partitioning attribute and the number of visits and dollar amounts as the x and y ordering attributes. **The color represents the dollar amount spent by the corresponding customer wherein high dollar amounts correspond to bright colors and low dollar amounts to dark colors**).

The claims 53 and 59 are subject to the same rationale of rejection set forth in the claim 47.

Re Claims 48, 54, and 60:

The claim 48 encompasses the same scope of invention as that of the claim 44 except additional claim limitation wherein the pixel bar chart comprises a plurality of columns, each column comprising a plurality of pixels and having a width measured in terms of pixels, and the method further comprises causing the width of at least one column to be different than the width of at least one other column. However, Keim further discloses the claim limitation wherein the pixel bar chart comprises a plurality of columns, each column comprising a plurality of pixels and having a width measured in terms of pixels, and the method further comprises causing the width of at least one column to be different than the width of at least one other column (*e.g.*, Figs. 1b, 3b, 4 and 9-10).

The claims 54 and 60 are subject to the same rationale of rejection set forth in the claim 48.

Re Claims 63, 67, 70-71, 77:

Keim further discloses the claim limitation of sorting the record assigned pixels in each sub-group according to the first and second ordering attributes and performing a two-dimensional sort of the record-assigned pixels in each sub-group. Keim discloses in Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10 the claim limitation. See also Page 2-3 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer; e.g., Pages 2-3 of Keim disclose a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as product type, number of visits and dollar amounts; the product type is used later as the

partitioning attribute and the number of visits and dollar amounts as the x and y ordering attributes. The color represents the dollar amount spent by the corresponding customer wherein high dollar amounts correspond to bright colors and low dollar amounts to dark colors; see also Pages 6-7 for the partitioning algorithm or the pixel placement algorithm; see Figs. 8-10 for the sub-groups of pixels according to a second dividing attribute.

Re Claim 64:

Keim further discloses the claim limitation of determining a first one-dimensional histogram for the first ordering attribute, and a second one-dimensional histogram for the second ordering attribute, wherein sorting the record-assigned pixels in each sub-group is based on the first and second one-dimensional histograms. Keim discloses in Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10 the claim limitation. See also Page 2-3 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer; e.g., Pages 2-3 of Keim disclose a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as product type, number of visits and dollar amounts; the product type is used later as the partitioning attribute and the number of visits and dollar amounts as the x and y ordering attributes. The color represents the dollar amount spent by the corresponding customer wherein high dollar amounts correspond to bright colors and low dollar amounts to dark colors; see also Pages 6-7 for the partitioning algorithm or the pixel placement algorithm; see Figs. 8-10 for the sub-groups of pixels according to a second dividing attribute.

Re Claim 65, 72 and 78:



Keim further discloses the claim limitation of selecting a visual indicator attribute from the plurality of attributes, wherein the visual indicator attribute is different from both the first and second ordering attributes; and applying colors to the record-assigned pixels according to the visual indicator attribute such that at least some of the record-assigned pixels have different colors. Keim discloses in Figs. 1b, 2, 3b, 4a, 4b, 4c and 9-10 the claim limitation. See also Page 2-3 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer; e.g., Pages 2-3 of Keim disclose a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as product type, number of visits and dollar amounts; the product type is used later as the partitioning attribute and the number of visits and dollar amounts as the x and y ordering attributes. The color represents the dollar amount spent by the corresponding customer wherein high dollar amounts correspond to bright colors and low dollar amounts to dark colors; see also Pages 6-7 for the partitioning algorithm or the pixel placement algorithm; see Figs. 8-10 for the sub-groups of pixels according to a second dividing attribute.

The claims 72 and 78 are subject to the same rationale of rejection set forth in the claim 65.

Re Claims 66, 69, 73, 75-76, 80 and 82:

Keim further discloses the claim limitation that partitioning into sub-groups causes at least some of the sub-groups to have different widths measured in terms of pixels along the first axis, and causes at least some of the sub-groups to have different heights measured in terms of pixels along the second axis (e.g., Figs. 6-7).

The claims 69, 73, 75-76, 80 and 82 are subject to the same rationale of rejection set forth in the claim 66.

Re Claims 68, 74 and 79:

Keim further discloses the claim limitation of constructing the pixel bar chart by arranging the sub-groups in an array defined by the first and second axes (*e.g., Figs. 6-7*).

The claims 74 and 79 are subject to the same rationale of rejection set forth in the claim 68.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 44-48, 50, 53-54, 56, 59-60, and 63-82 are rejected under 35 U.S.C. 102(b) as being anticipated by M. Ankerst, M. Ester, H.-P. Kriegel, “Towards an effective cooperation of the computer and the user for classification”, Proc. 6<sup>th</sup> Int. Conf. On Knowledge Discovery and Data Mining, (KDD ‘2000), Aug. 20-23, 2000, Boston, MA, 2000, pp. 1-10 (hereinafter Ankerst).

Re Claims 44, 50, 56, and 81:

Art Unit: 2628

Ankerst discloses a method to form a pixel bar chart (*e.g., the last row of the pixel bar charts of Fig. 3 represents a pixel bar chart which is particularly sorted by the attribute 120*), comprising:

Obtaining a set of records, each record comprising a plurality of attributes (*e.g., Pages 3 of Ankerst discloses data records of the DNA training data with a plurality of attributes and Fig 5 plots 50,000 data records from two different classes with two numerical attributes*);

Assigning a pixel to each of said records to provide record-assigned pixels, wherein every such record-assigned pixel in the chart is assigned to a different record (*e.g., Figs. 3-5 and 7 discloses the pixel bar charts. e.g., the last row of the pixel bar charts of Fig. 3 represents a pixel bar chart which particularly sorted by the attribute 120 wherein every pixel in each of the charts is assigned to a unique record and the claim limitation that every pixel in the chart is assigned to a record is explicitly taught in column 2 of Page 3*); and

Constructing the pixel bar chart by (*Figs. 3-5 and 7 disclose pixel bar charts*):

Partitioning the record-assigned pixels into groups (*of pixels ordered according to the attribute values; see Figs. 4-5 wherein pixels are organized into groups along the y-axis in accordance with the categorical attribute numbers*) along a first axis of the pixel bar chart according to a first dividing attribute (*e.g., See Figs. 3-5 and 7 wherein the colored pixels are clearly shown wherein the first dividing attribute is set forth in the x-axis. See Page 3. Within a bar, the sorted attribute values are mapped to pixels in a line-by-line fashion according to their order (See Fig. 2 or Fig. 4 for this order). Each attribute is visualized independently from the other attributes in a separate bar. Thus the first dividing attribute is the ordering for the categorical attributes in accordance with the categorical attribute numbers; see Fig. 5*);

Partitioning the record-assigned pixels in the groups into sub-groups (*See Fig. 4-5 wherein the pixels in the groups of categorical attributes are further divided into sub-groups or class partitions along the x-axis in accordance with the splitting attribute by performing an n-ary split*) along a second axis of the pixel bar chart according to a second dividing attribute (*e.g., splitting as disclosed in Page 5; the second dividing attribute is the splitting attribute and thus second dividing attribute is along the x-axis of Fig. 3-5 wherein the attributes are divided along the x-axis into class partitions by the virtue of the splitting attribute*);

After partitioning into the sub-groups, sorting, in each of the sub-groups, the record-assigned pixels according to a first ordering attribute (*e.g., See Figs. 3-5 and 7 wherein the pixels in the class partitions are sorted in accordance with the categorical attribute numbers and the first group of the class partitions is ordered in the lower level and the second group of the class partitions is ordered in the upper level; more categorical attributes are shown in Fig. 3*) along the first axis of the pixel bar chart, and according to a second ordering attribute along the second axis of the pixel bar chart (*Fig. 3-5 and 7 discloses the second ordering attribute on the x-axis, e.g., the second ordering attribute ordered according to the attribute values falling into Class A, Class B or Class C by splitting the pixels into the set of class partitions in accordance with the splitting attribute wherein the second ordering attribute is the class partition attribute or the splitting attribute characterized by the categorical attribute numbers falling into the class partitions*), wherein each record-assigned pixel is adjacent at least one other record-assigned pixel (*Figs. 3-5 and 7*).

Art Unit: 2628

The claims 50, 56 and 81 are subject to the same rationale of rejection set forth in the claim 44.

Re Claims 45 and 57:

The claim 45 encompasses the same scope of invention as that of the claim 44 except additional claim limitation for each record-assigned pixel assigning a selectable visual indicator to the record-assigned pixel based on an attribute value of each record so that some pixels have a different visual indicator than other pixels. However, Ankerst further discloses the claim limitation for each record-assigned pixel assigning a selectable visual indicator to the record-assigned pixel based on an attribute value of each record so that some pixels have a different visual indicator than other pixels (*Figs. 3-5 and 7 wherein the colored pixels are clearly shown* and *Fig. 1 illustrates a possible color coding of the different class labels and Figs. 3-5 and 7 illustrate the color coded pixels wherein one segment of pixels has different colors from the other segment of pixels*).

The claim 57 is subject to the same rationale of rejection set forth in the claim 45.

Re Claims 46 and 58:

The claim 46 encompasses the same scope of invention as that of the claim 45 except additional claim limitation the visual indicator comprises color. However, Ankerst further discloses the claim limitation the visual indicator comprises color (*Figs. 3-5 and 7 wherein the colored pixels are clearly shown* and *Fig. 1 illustrates a possible color coding of the different*

Art Unit: 2628

*class labels and Figs. 3-5 and 7 illustrate the color coded pixels wherein one segment of pixels has different colors from the other segment of pixels).*

The claim 58 is subject to the same rationale of rejection set forth in the claim 46.

Re Claims 47, 53 and 59:

The claim 47 encompasses the same scope of invention as that of the claim 44 except additional claim limitation said records are obtained from a multidimensional data set in which each record comprises a plurality of attributes and said method further comprises assigning a selectable visual indicator to each record-assigned pixel based on an attribute of each record so that some pixels have a different visual indicator than other pixels. However, Ankerst further discloses the claim limitation said records are obtained from a multidimensional data set in which each record comprises a plurality of attributes (*e.g., Pages 3 of Ankerst discloses data records of the DNA training data with a plurality of attributes and Fig 5 plots 50,000 data records from two different classes with two numerical attributes*) and said method further comprises assigning a selectable visual indicator (*e.g., color*) to each record-assigned pixel based on an attribute of each record so that some pixels have a different visual indicator than other pixels (*Figs. 3-5 and 7 wherein the colored pixels are clearly shown* and *Fig. 1 illustrates a possible color coding of the different class labels and Figs. 3-5 and 7 illustrate the color coded pixels wherein one segment of pixels has different colors from the other segment of pixels*).

The claims 53 and 59 are subject to the same rationale of rejection set forth in the claim 47.

Re Claims 48, 54, and 60:

The claim 48 encompasses the same scope of invention as that of the claim 44 except additional claim limitation wherein the pixel bar chart comprises a plurality of columns, each column comprising a plurality of pixels and having a width measured in terms of pixels, and the method further comprises causing the width of at least one column to be different than the width of at least one other column. However, Ankerst further discloses the claim limitation wherein the pixel bar chart comprises a plurality of columns, each column comprising a plurality of pixels and having a width measured in terms of pixels, and the method further comprises causing the width of at least one column to be different than the width of at least one other column (*e.g., by splitting as disclosed in Page 3 by selecting the splitting attribute of Page 4; See Figs. 3-5 and 7 wherein the colored pixels are clearly shown and Fig. 1 illustrates a possible color coding of the different class labels and Figs. 3-5 and 7 illustrate the color coded pixels wherein one segment of pixels has different colors from the other segment of pixels*).

The claims 54 and 60 are subject to the same rationale of rejection set forth in the claim 48.

Re Claims 63, 67, 70-71, 77:

Ankerst further discloses the claim limitation of sorting the record assigned pixels in each sub-group according to the first and second ordering attributes and performing a two-dimensional sort of the record-assigned pixels in each sub-group (*e.g., the first ordering attribute is according to the categorical attribute numbers; see Figs. 2-5 and the second ordering attribute is according to the splitting attributes by splitting the group into class partitions*).

Art Unit: 2628

Re Claim 64:

Ankerst further discloses the claim limitation of determining a first one-dimensional histogram for the first ordering attribute, and a second one-dimensional histogram for the second ordering attribute, wherein sorting the record-assigned pixels in each sub-group is based on the first and second one-dimensional histograms (*e.g., the first ordering attribute is according to the categorical attribute numbers; see Figs. 2-5 and the second ordering attribute is according to the splitting attributes by splitting the group into class partitions*).

Re Claim 65, 72 and 78:

Ankerst further discloses the claim limitation of selecting a visual indicator attribute from the plurality of attributes, wherein the visual indicator attribute is different from both the first and second ordering attributes; and applying colors to the record-assigned pixels according to the visual indicator attribute such that at least some of the record-assigned pixels have different colors (*Fig. 1 illustrates a possible color coding of the different class labels and Figs. 3-5 and 7 illustrate the color coded pixels wherein one segment of pixels has different colors from the other segment of pixels*).

The claims 72 and 78 are subject to the same rationale of rejection set forth in the claim 65.

Re Claims 66, 69, 73, 75-76, 80 and 82:

Ankerst further discloses the claim limitation that partitioning into sub-groups causes at least some of the sub-groups to have different widths measured in terms of pixels along the first axis, and causes at least some of the sub-groups to have different heights measured in terms of



Art Unit: 2628

pixels along the second axis (e.g., Fig. 3-5 wherein the data records having the categorical attribute 1 is clearly different from the data records having the categorical attribute 2 and therefore the widths are different and the heights of the class partitions are clearly different; see Page 5).

The claims 69, 73, 75-76, 80 and 82 are subject to the same rationale of rejection set forth in the claim 66.

Re Claims 68, 74 and 79:

Ankerst further discloses the claim limitation of constructing the pixel bar chart by arranging the sub-groups in an array defined by the first and second axes (e.g., Fig. 3-5).

The claims 74 and 79 are subject to the same rationale of rejection set forth in the claim 68.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by **others** in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 44-48, 50, 53-54, 56, 59-60, and 63-82 are rejected under 35 U.S.C. 102(a) as being anticipated by **M.C. Hao, J. Ladisch, U. Dayal, M. Hsu, A. Krug**; “Visual Mining of E-customer Behavior Using Pixel Bar Charts”, HP Technical Report, June 20, 2001, pp. 1-7 (hereinafter Hao).

Re Claims 44, 50, 56 and 81:

Hao discloses a method to form a pixel bar chart, comprising:

Obtaining a set of records, each record comprising a plurality of attributes (*e.g., Pages 1 and 5-6 of Hao disclose a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as time type, number of visits and dollar amounts; the time type is the x-axis and the purchase dollar amount is the y-ordering attribute and the number of visits are the color attributes*);

Assigning a pixel to each of said records to provide record-assigned pixels, wherein every such record-assigned pixel in the chart is assigned to a different record (*e.g., Page 5-6; Figs. 1, 2, 4, 5, and 6*); and

Constructing the pixel bar chart by (*e.g., Page 5-6; Figs. 1, 2, 4, 5, and 6 disclose pixel bar charts*);

Partitioning the record-assigned pixels into groups along a first axis of the pixel bar chart according to a first dividing attribute (*e.g., Page 3 wherein the first dividing attribute is along x-axis such as "Month"; Figs. 1, 2, 4, 5, and 6*);

Partitioning the record-assigned pixels in the groups into sub-groups along a second axis of the pixel bar chart according to a second dividing attribute (*See Page 3 wherein the second dividing attribute is along the y-axis based on the attribute values such as the purchase amount or search type; see Fig. 2 wherein the sub-groups are the clusters of pixels having the same attribute values of the second ordering attribute and the second ordering attribute is the same as the second dividing attribute*);

After partitioning into the sub-groups, sorting, in each of the sub-groups, the record-assigned pixels according to a first ordering attribute (Page 5 discloses the first ordering attribute on the x-axis and the second order attribute on the y-axis as does e.g., Page 5-6; Figs. 1, 2, 4, 5, and 6) along the first axis of the pixel bar chart, and according to a second ordering attribute along the second ordering attribute along the second axis of the pixel bar chart (e.g., See Page 3 wherein the second dividing attribute is along the y-axis based on the attribute values such as the purchase amount or search type; see Fig. 2 wherein the sub-groups are the clusters of pixels having the same attribute values of the second ordering attribute and the second ordering attribute is the same as the second dividing attribute. See Page 5-6; Figs. 1, 2, 4, 5, and 6. See also Page 5-6 and Figs. 5-6 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer; e.g., Pages 5-6 of Hao disclose a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as time type, number of visits and dollar amounts), wherein each record-assigned pixel is adjacent at least one other record-assigned pixel (e.g., Page 5-6; Figs. 1, 2, 4, 5, and 6).

The claims 50, 56 and 81 are subject to the same rationale of rejection set forth in the claim 44.

Re Claims 45 and 57:

The claim 45 encompasses the same scope of invention as that of the claim 44 except additional claim limitation for each record-assigned pixel assigning a selectable visual indicator to the record-assigned pixel based on an attribute value of each record so that some pixels have a

Art Unit: 2628

different visual indicator than other pixels. However, Hao further discloses the claim limitation for each record-assigned pixel assigning a selectable visual indicator to the record-assigned pixel based on an attribute value of each record so that some pixels have a different visual indicator than other pixels (*e.g., Page 5-6; Figs. 1, 2, 4, 5, and 6. See also Page 5-6 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer*).

The claim 57 is subject to the same rationale of rejection set forth in the claim 45.

Re Claims 46 and 58:

The claim 46 encompasses the same scope of invention as that of the claim 45 except additional claim limitation the visual indicator comprises color. However, Hao further discloses the claim limitation the visual indicator comprises color (*e.g., Page 5-6; Figs. 1, 2, 4, 5, and 6. See also Page 5-6 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer, e.g., sales amount, number of visits or sales quantity*).

The claim 58 is subject to the same rationale of rejection set forth in the claim 46.

Re Claims 47, 53 and 59:

The claim 47 encompasses the same scope of invention as that of the claim 44 except additional claim limitation said records are obtained from a multidimensional data set in which each record comprises a plurality of attributes and said method further comprises assigning a selectable visual indicator to each record-assigned pixel based on an attribute of each record so

that some pixels have a different visual indicator than other pixels. However, Hao further discloses the claim limitation said records are obtained from a multidimensional data set in which each record comprises a plurality of attributes and said method further comprises assigning a selectable visual indicator to each record-assigned pixel based on an attribute of each record so that some pixels have a different visual indicator than other pixels (*e.g., Page 5-6; Figs. 1, 2, 4, 5, and 6. See also Page 5-6 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer; e.g., Pages 5-6 and Fig. 6 of Hao disclose a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as time type, number of visits and dollar amounts*).

The claims 53 and 59 are subject to the same rationale of rejection set forth in the claim 47.

Re Claims 48, 54, and 60:

The claim 48 encompasses the same scope of invention as that of the claim 44 except additional claim limitation wherein the pixel bar chart comprises a plurality of columns, each column comprising a plurality of pixels and having a width measured in terms of pixels, and the method further comprises causing the width of at least one column to be different than the width of at least one other column. However, Hao further discloses the claim limitation wherein the pixel bar chart comprises a plurality of columns, each column comprising a plurality of pixels and having a width measured in terms of pixels, and the method further comprises causing the

width of at least one column to be different than the width of at least one other column (*e.g.*, *Page 5-6; Figs. 1, 2, 4, 5, and 6*).

The claims 54 and 60 are subject to the same rationale of rejection set forth in the claim 48.

Re Claims 63, 67, 70-71, 77:

Hao further discloses the claim limitation of sorting the record assigned pixels in each sub-group according to the first and second ordering attributes and performing a two-dimensional sort of the record-assigned pixels in each sub-group. Hao discloses in Page 3 the claim limitation. Hao discloses in Page 3 that the second dividing attribute is along the y-axis based on the attribute values such as the purchase amount or search type; see Fig. 2 wherein the sub-groups are the clusters of pixels having the same attribute values of the second ordering attribute and the second ordering attribute is the same as the second dividing attribute.

Re Claim 64:

Hao further discloses the claim limitation of determining a first one-dimensional histogram for the first ordering attribute, and a second one-dimensional histogram for the second ordering attribute, wherein sorting the record-assigned pixels in each sub-group is based on the first and second one-dimensional histograms. Hao discloses in Page 3 the claim limitation. Hao discloses in Page 3 that the second dividing attribute is along the y-axis based on the attribute values such as the purchase amount or search type; see Fig. 2 wherein the sub-groups are the clusters of pixels having the same attribute values of the second ordering attribute and the second ordering attribute is the same as the second dividing attribute.

Re Claim 65, 72 and 78:

Hao further discloses the claim limitation of selecting a visual indicator attribute from the plurality of attributes, wherein the visual indicator attribute is different from both the first and second ordering attributes; and applying colors to the record-assigned pixels according to the visual indicator attribute such that at least some of the record-assigned pixels have different colors. Hao discloses in Page 3 the claim limitation. Hao discloses in Page 3 that the second dividing attribute is along the y-axis based on the attribute values such as the purchase amount or search type; see Fig. 2 wherein the sub-groups are the clusters of pixels having the same attribute values of the second ordering attribute and the second ordering attribute is the same as the second dividing attribute. See also Page 5-6 and Figs. 5-6 that the pixels are colored corresponding to the different attribute values wherein the color represent an additional attribute of the customer; e.g., Pages 5-6 of Hao disclose a set of data items corresponding to a set of records such as e-commerce sales transactions with data records having such attributes as time type, number of visits and dollar amounts.

The claims 72 and 78 are subject to the same rationale of rejection set forth in the claim 65.

Re Claims 66, 69, 73, 75-76, 80 and 82:

Hao further discloses the claim limitation that partitioning into sub-groups causes at least some of the sub-groups to have different widths measured in terms of pixels along the first axis, and causes at least some of the sub-groups to have different heights measured in terms of pixels along the second axis (*e.g., Fig. 2 and Page 3*).

Art Unit: 2628

The claims 69, 73, 75-76, 80 and 82 are subject to the same rationale of rejection set forth in the claim 66.

Re Claims 68, 74 and 79:

Hao further discloses the claim limitation of constructing the pixel bar chart by arranging the sub-groups in an array defined by the first and second axes (*e.g., Fig. 2 and Page 3*).

The claims 74 and 79 are subject to the same rationale of rejection set forth in the claim 68.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (571) 272-7665. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung can be reached on (571) 272-7794. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 2628

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

jcw

*Jinsheng Wang*